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ABSTRACT

This digest provides basic information designed to help people determine which of the many physical activity guidelines are most appropriate for use in specific situations. After an introduction, the digest focuses on: "Factors to Consider in Selecting Appropriate Physical Activity Guidelines" (group credibility and purpose, benefits to be expected if guidelines are followed, and people for whom the guidelines are intended); "Interpreting Existing Physical Activity Guidelines" (the early years: a fitness focus, and 1992 to the present: the emerging health focus); and "Making Sense of Current Recommendations": the physical activity pyramid, which offers one method of classifying guidelines and includes lifestyle physical activities; active aerobic, active sports, and recreational activities; muscle fitness and flexibility exercises; and inactivity; prevention of premature health problems; and other recommendations (e.g., physical activity recommendations for children). (Contains 34 references.) (SM)

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President's Council on Physical Fitness and Sports

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Making Sense of Multiple Physical Activity Recommendations

A Note from the Editors

Because many different agencies and organizations have distributed guidelines for various types of physical activity in recent years, the general public may be confused concerning which activity guidelines to follow. We felt that it was important, especially at this time, to provide basic information to help both professionals and lay people concerning physical activity guidelines. In this issue of the *Digest*, the authors provide basic information designed to help readers determine which of the many guidelines are most appropriate for use in specific situations.

Introduction

How much physical activity is enough? This is a question that has been asked for centuries. Though we have known for hundreds of years that physical activity has benefits, it has only been in the past 50 years that formal scientifically based guidelines have been developed. Ideally physical activity would be prescribed for a specific individual based on personal needs and interests. Statements of guidelines provided by experts are designed to help in individual prescriptions, but are typically general rather than individual in nature. This is because those drafting the guidelines cannot be aware of the needs of all individuals who may be employing the guidelines. The statements are called "guidelines" because they provide information that can aid in individualizing activity prescriptions. The best of guidelines are well supported by scientific evidence and endorsed by respected experts. However, as the American College of Sports Medicine indicates (ACSM, 2000), physical activity prescription is both an art and a science. It is important that all people who apply physical activity guidelines understand the scientific reasons for the guidelines and use them artfully with consideration for those to whom the guidelines are being applied. If this is to happen, it is important to consider a variety of factors when choosing which guidelines (from many that are available) to apply.

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Factors to Consider in Selecting Appropriate Physical Activity Guidelines

There are literally thousands of sources that include physical activity guidelines. Guidelines can come from individuals or groups. Articles and books by individuals or groups of individuals provide guidelines for physical activity prescription. For example, many previous issues of the *Digest* include articles that provide guidelines for physical activity prescription (see Table 3). Guidelines that receive the most attention are prepared by groups of experts (organizations, agencies, etc.). Guidelines by these types of groups will be discussed here. When making decisions about which guidelines to use in a given situation, the following factors should be considered:

- Is the organization/agency making the recommendation credible?
- What is the mission or purpose of the recommending group?
- What benefits can be expected if the guidelines are followed?
- For what groups or types of people are the guidelines intended?

Group credibility and purpose

Among the types of groups making physical activity recommendations are governmental agencies such as the Office of the Surgeon General (OSG), the Centers

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for Disease Prevention and Control (CDC), and the President's Council on Physical Fitness and Sports (PCPFS); professional organizations such as the ACSM, the American Alliance for Health, Physical Education for Recreation and Dance (AAHPERD), and the National Association for Sport and Physical Activity (NASPE); and private organizations such as the American Heart Association (AHA) and the Institute of Medicine (IOM) of the National Academies of Science. These are only a few of the credible groups who rely on experts to establish guidelines, to write documents, and to review them before publication. Because not all groups are credible, establishing the credibility of the group making the recommendations is critical.

Because organizations and agencies have different missions, the intent of guidelines issued by one group may differ substantially from the intent of another. For this reason it is important to know something about the mission of the group responsible for developing a specific set of guidelines. Governmental organizations, such as the OSG and CDC, are especially likely to focus on general health issues. While they make recommendations about physical activity, they also make recommendations concerning other health-promoting behaviors. The PCPFS has a more specific purpose and is likely to limit its recommendations to behaviors associated with fitness and physical activity promotion. Professional organizations such as ACSM, AAHPERD, and NASPE focus on physical activity and typically make recommendations that relate specifically to this type of behavior. The AHA is a private organization that typically focuses its recommendations on behaviors that affect heart disease, while the IOM has different committees, such as the Foods and Nutrition Board that focuses on nutrition guidelines, as well as others that focus on other scientific issues. This board has recently made recommendations about physical activity as well. All are credible, but when drafting guidelines for physical activity, each organization will approach the matter from a different perspective. Examples will be considered later in this paper.

Benefits to be expected if guidelines are followed

Formal physical activity guidelines are typically designed to provide specific benefits. Among the more common are: fitness, illness prevention, wellness promotion, and weight control. Selected benefits within each of these categories are listed in Table 1. Because different organizations and agencies have different missions, one group may focus on one type of benefit while another group may focus on different benefits.

Table 1.
Selected Benefits Associated with Physical Activity

Fitness	Illness Prevention	Wellness Promotion	Weight Control
Cardiovascular	Heart disease	Optimal functioning	Weight loss
Strength	Diabetes	General well-being	Weight gain
Muscular endurance	Osteoporosis	Enjoyable leisure	Weight maintenance
Flexibility	Back problems	Mental health	
Body composition	Some forms of cancer		

People for whom guidelines are intended

In an attempt to develop guidelines that can be artfully and scientifically applied to meet the needs of specific individuals, organizations and agencies may offer more than one set of physical activity guidelines. This is because guidelines for one group of people may be quite different from those to be used with a different group. Examples of the types of groups for which specific guidelines may be written are: children, adolescents, adults, older adults, people with illness (e.g., heart patients, diabetics), and other special populations (e.g., mentally challenged, disabled).

Interpreting Existing Physical Activity Guidelines

The early years: A fitness focus

Prior to the 1970s, few formal statements of guidelines were forthcoming from organizations and agencies concerning physical activity. This is partly because the body of evidence concerning physical activity was much less advanced than it is today. For this reason, agencies such as the OSG and CDC had little interest in physical activity. Also the ACSM, the professional organization most responsible for preparing statements of guidelines, was established in 1953 and was just beginning to emerge as a national force in the 1970s.

The ACSM was the first to develop statements of physical activity guidelines that were widely disseminated. Formed in 1954 by eleven physicians, physiologists and educators, the ACSM has grown into a professional organization with over 18,000 international, national, and regional members, making it the largest sports medicine and exercise science organization in the world. Early guidelines issued by the ACSM focused on fitness promotion, perhaps because more knowledge had been accumulated about fitness benefits than general health benefits. Also fitness for sports participation was, and still is, one of the areas of focus of the organization.

The ACSM publishes *ACSM's Guidelines for Exercise Testing and Prescription*, one of the most widely referenced guidebooks of its kind in the world (ACSM, 2000). The ACSM exercise prescription guidelines, now in the 6th edition, have been long regarded as the nation's fitness and activity guidelines. For nearly three decades, the ACSM has published the exercise testing and prescription guidelines text, expanding each edition to include exercise testing and prescription guidelines for normal and clinical populations, as well as children, the elderly, and pregnant women (ACSM, 2000).

The ACSM has published position stands on cardiorespiratory fitness (1978, 1990, 1998), muscle fitness (1990, 1998), flexibility (1998), and body composition (1978), as well disease prevention (1993, 1994, 1995). While the ACSM's exercise prescription guidelines and position statements are not technically national recommendations, they are

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viewed as such because of the comprehensive knowledge that has been gathered to develop them. The ACSM guidelines serve as the health and fitness industry's standard template for physical activity and exercise prescription with normally healthy people, cardiac rehabilitation patients, and various special populations.

1992 to the present: The emerging health focus

Based on a wealth of scientific evidence demonstrating that moderate-intensity physical activity (MPA) can positively impact health, broader guidelines for physical activity emerged. Numerous epidemiological studies beginning as early as the 1950s (Blair et al., 1989; Morris, Hady, Raffle, Roberts, & Parks, 1953; Paffenbarger et al., 1993; Paffenbarger, Wing, & Hyde, 1978) demonstrated the health benefits of engaging in regular MPA. Research continues to accumulate in support of the effectiveness of moderate and vigorous activity irrespective of race, age, and body mass, in preventing morbidity and mortality (Lee, Rexrode, Cook, Manson, & Buring, 2001; Manson et al., 2002; Manson et al., 1999; Tanasescu et al., 2002).

In 1992, the American Heart Association in association with several other agencies, including the ACSM, identified physical inactivity as a risk factor for coronary artery disease (AHA, 1992). This report provided guidelines for MPA as a method of risk reduction for heart diseases.

The landmark Report on Physical Activity and Health issued by the Office of the Surgeon General (USDHHS, 1996) was important for many reasons. First, it signified a shift in focus from promoting physical activity as a method of achieving physical fitness to physical activity promotion as a method of reducing disease risk and improving health, as well as achieving fitness. Second, although issued by the OSG, the physical activity recommendations contained in the report represented a cooperative effort of governmental agencies (OSG, CDC, PCPFS), and involved the participation of professional and private organizations. For example, the ACSM had considerable involvement and the Senior Editor, Steve Blair, was a former ACSM President and a scientist at the Cooper Institute for Aerobics Research. Finally, the recommendation was designed to focus on benefits for the larger portion of American adults.

The basic recommendation of the 1996 report suggested all American adults accumulate *at least* 30 minutes of MPA equivalent to brisk walking on most, if not all, days of the week (USDHHS, 1996). For many professionals in the field who had been using the American College of Sports Medicine's (ACSM) guidelines for improving cardiovascular fitness, this new physical activity recommendation was not well received initially. In subsequent years, professionals have come to realize that the new physical activity recommendations were complementary, not contradictory, to earlier recommendations for cardiovascular fitness that included a prescription for more vigorous exercise. It is important to understand that the existing recommendations for fitness and physical activity were developed for different purposes.

In the same year that the *OSG Report on Physical Activity and Health* was published, experts in the field of physical education and physical activity promotion published an article in order to help professionals clarify the role and application of concomitant fitness and physical activity recommendations (Corbin & Pangrazi, 1996). In the article, the authors delineated the differences between the ACSM guidelines for improving cardiorespiratory fitness and the OSG's physical activity recommendation. Most importantly, the article explained how the OSG guidelines were complementary to the existing ACSM guidelines for improving cardiorespiratory fitness.

The physical activity promotion strategy behind the OSG guidelines was to encourage the greatest benefit for the greatest number of people. They were designed to help people do *some* physical activity rather than *none*. In fact, "One of the assumptions underlying the physical activity recommendations is that lower doses of activity (i.e., intensity and duration) are more enjoyable for the average person, thus leading to higher involvement and adherence rates" (Ekkekakis & Petruzzello, 1999, p. 337). Recent research has demonstrated that even healthy young adults may perceive vigorous exercise negatively (Hall, Ekkekakis, & Petruzzello, 2002). Thus, it is important for the general public to clearly understand that health benefits can be achieved through modest amounts of daily MPA.

The strategy behind earlier guidelines recommending more vigorous activity was cardiovascular fitness promotion. Those interested in more vigorous exercise and achieving fitness benefits will find it appropriate to continue to use these guidelines. In addition to fitness benefits, engaging in vigorous physical activity often provides health benefits greater than those provided by moderate activity (USDHHS, 1991). It is appropriate to use ACSM guidelines for cardiovascular fitness and/or the OSG recommendations depending on the benefits expected and the type of people to whom the guidelines are to be applied.

On September 5th, 2002, a committee from a private organization, the Institute of Medicine (IOM), made a well-publicized physical activity recommendation. The recommendation of the Foods and Nutrition Board of the IOM made headlines in major newspapers and television newscasts across the United States. It suggested that adults get at least 60 minutes a day of MPA, double the amount of physical activity recommended by the OSG. The official report stated, ". . . to prevent weight gain as well as to accrue additional, weight-independent health benefits of physical activity, 60 minutes of daily moderate intensity physical activity is recommended . . ." (IOM, 2002, p. 697).

Just as many people perceived the OSG activity guidelines as a substitute for the earlier exercise prescriptions guidelines of the ACSM, many perceived the IOM recommendation as a substitute for the OSG recommendations. As noted in an earlier section, the nature and purpose of an organization, the benefits to be achieved, and the group of people for whom guidelines are prepared are of great importance. The IOM is a private organization and a branch of the National Academy of Sciences. The guidelines were actually prepared by the Food and Nutrition Board of the IOM (IOM, 2002). In the popular media, the primary focus was the IOM recommendation calling for 60 minutes of daily MPA. The media failed to report the basis for the IOM's recommendation, which was primarily based on the amount

of activity necessary for body weight management. Specifically the report notes ". . . 30 minutes per day of regular activity is insufficient to maintain body weight in adults in the recommended body mass range from 18.5 up to 25 kg/m² and achieve all the identified health benefits fully. Hence, to prevent weight gain as well as to accrue additional, weight-independent health benefits of physical activity, 60 minutes of daily moderate intensity physical activity (e.g., walking/jogging at 4 to 5 mph) is recommended, in addition to activities required by a sedentary lifestyle" (IOM, 2002, p. 697). The IOM further noted, "As both lack of physical activity and obesity are now recognized as risk factors for several chronic diseases, logic requires that activity recommendations accompany dietary recommendations" (IOM, 2002, p. 698).

Table 2.
Selected Statements of Physical Activity Guidelines

Group and Date	Benefits	Population
1978 ACSM	Aerobic fitness	Healthy adults
1990 ACSM	Aerobic fitness, muscle fitness	Adults
1992 AHA	Reduce heart disease risk	General population
1994 Consensus Conference	General health and fitness benefits	Adolescents
1996 OSG	Illness prevention and health promotion	Adults with focus on promoting health among sedentary
1998 ACSM	Disease risk reduction, aerobic fitness, muscle fitness, flexibility	General population
2000 ACSM, and earlier editions.	Comprehensive physical activity prescription recommendations	Multiple populations including apparently healthy and special populations
1998 NASPE	General health, fitness and wellness	Children 9-12
2002 NASPE	General health, fitness and wellness	Toddlers
2002 IOM	Weight management	Adults

Since the IOM statement, various experts from various organizations have made comments to help clarify the fact that the IOM guidelines do not supplant OSG guidelines. Experts are quick to point out that the IOM is a private group, and the goals of the Foods and Nutrition Board of the IOM focus primarily on nutrition and weight management. Accordingly, the IOM recommendations are different from the OSG's recommendation in focus and purpose. While authorities from the ACSM and the Cooper Institute for Aerobics Research commended the IOM for including physical activity as part of their report, concern was raised over the confusion created by the IOM recommendations (ACSM, 2002). They pointed out the fact that the IOM and OSG recommendations were directed at different benefits and different populations, and that the public should view them as complementary rather than competing. The president of ACSM noted, "Additional health benefits can be gained through greater amounts of physical activity" (USDHHS, 1996, p. 4), but at the same time emphasized that the OSG recommendations were prepared to help the greatest number of people achieve the greatest heath benefits.

The preceding discussion is presented to illustrate the fact that selecting guidelines for use should be based on the factors described in the beginning of this paper. Guidelines that are appropriate for one group, or that are directed toward achieving one type of benefit, may not be appropriate for another group seeking different benefits.

Making Sense of Current Recommendations

Table 2 illustrates some of the major statements of physical activity guidelines that have been made in the past 25 years. The source of the guidelines, the date the guidelines were made, the benefits to be derived if guidelines are followed, and the specific population for which the guidelines are intended are provided.

The physical activity pyramid: One method of classification of guidelines

The physical activity pyramid (see Figure 1) can be used to classify activities by type and associated benefits, making it a useful model for sorting out multiple recommendations. Four levels of activity are included in the pyramid that can be used as categories to simplify exercise prescription. Once the goals of an individual are known, how much physical activity is enough can be determined using the appropriate frequency (F), intensity (I) and duration/time (T) for that type of physical activity. The FIT formula is a term frequently used to describe the frequency, intensity and time of physical activity for achieving a specific activity outcome (e.g., fitness, disease risk reduction). People are encouraged to select activities from each of the four levels of the physical activity pyramid, as they would from the USDA food pyramid, and to apply the appropriate FIT formula for each.

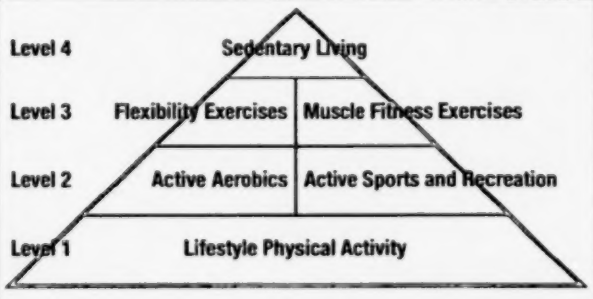

Figure 1.
The Physical Activity Pyramid

Adapted from Corbin, C. B. & Lindsey, R. (2002). *Fitness for Life* (4th Ed.). Champaign, IL: Human Kinetics.

Level 1: Lifestyle physical activities.

Lifestyle physical activities (LPAs) occupy the first level of the pyramid (see Figure 1). Time spent in LPAs equal to brisk walking, such as mowing the lawn and climbing stairs, characterize this level. Frequency of activity is typically all or most days of the week. Benefits include general health promotion, chronic disease risk reduction, and contribution to weight maintenance. The AHA, OSR and IOM recommendations in Table 2 focus on this level of activity.

Level 2: Active aerobic, active sports, and recreational activities

The types of activities at Level 2 are more vigorous in nature. They include active aerobics, active sports, and recreation. Active aerobics are performed at an intensity at which the body can supply enough oxygen to meet the activity's demands, such as aerobic dance, jogging, and biking. LPAs are aerobic in nature and fit this description, but LPAs differ from active aerobics because they do not elevate the heart rate to a high level. For optimal cardiorespiratory fitness benefits, active aerobics should elevate the heart to between 50 and 85% (moderate to vigorous) of the working heart range. The frequency and time spent in active aerobics can be reduced if the activities are performed at vigorous intensity levels.

Active sports are typically more vigorous than LPAs. Many sports such as basketball, racquetball, and tennis require short bursts of vigorous to maximal intensity bursts with short rest periods in between. While not completely aerobic in nature, because of the short bursts of anaerobic activity, active sports provide many of the same benefits as aerobic activities. The same F.I.T. formula for active aerobics is applied to active sports and recreation, but it is important to realize that many sports such as golf, bowling, and softball should be considered LPAs. Recreational activities such as hiking, kayaking, and rock climbing, if performed at a vigorous intensity, can be used to meet the three-day moderate to vigorous recommendation for active sports.

It is important to understand that engaging in more vigorous exercise will not only provide fitness benefits, but will also confer health benefits beyond what can be achieved with LPAs alone. Many of the ACSM recommendations in Table 2 are for activities at this level of the pyramid.

Level 3: Muscle fitness and flexibility exercises

Muscle fitness exercises occupy level 3 of the physical activity pyramid. The benefits include an improved ability to perform activities of daily living, increased bone density and minimized bone density loss (reduced risk of osteoporosis), and increased lean tissue (ACSM, 1998). It is suggested that muscle fitness be performed two to three days per week, involving eight to 10 exercises targeting the major muscle groups. Recent research (Rhea, Alvar, Ball, & Burkett, 2002) has demonstrated that three sets are superior to one set of exercises; however, one set may be adequate for those interested in health benefits rather than high level performance. The ACSM position statements (guidelines) on muscle fitness for adults and older adults are examples of recommendations for this level of the pyramid.

Flexibility exercise

Also occupying level 3 of the pyramid is flexibility. Flexibility is the ability to use joints through the full range of motion (ROM). There is no doubt that activities from levels 1, 2, and 3 (muscle fitness) of the pyramid can positively contribute to flexibility development, but if the goal is to substantially improve flexibility in multiple areas of the body, engaging in specific flexibility exercises is recommended. Benefits are thought to be reduced risk of musculoskeletal injury, reduced risk of back problems, and improved performance capacity. Flexibility exercises should be performed three to seven days per week. Stretching each of the body's major muscle groups to the point of mild discomfort should be repeated several times, and the stretches should be held for 15 to 30 seconds (ACSM, 2000).

Level 4: Inactivity

At the apex of the physical activity pyramid is inactivity. Inactivity and rest are important for recovering and relaxing, but inactivity (sedentary living) has been identified as a risk factor for coronary artery disease (AHA, 1992). Other than normal sleep (6-8 hours), excessive inactivity accumulated by watching television, playing video games, working at a computer, and driving should be counteracted by engaging in LPAs or activities from the other levels of the pyramid. In a recent epidemiological study (Manson et al., 2002), it was concluded that prolonged sitting leads to an increased cardiovascular disease risk.

Body composition

Body composition relates to the relative percentage of muscle, bone, fat, and other tissue that comprise the body. Activities from the first three levels of the pyramid can help balance energy intake with energy expenditure. Body composition is influenced by heredity, but can be controlled by balancing energy intake with energy expenditure. The ACSM recommends a target range of 150 to 400 kcal of energy expenditure per day in physical activity or exercise, but notes that caloric thresholds necessary for weight maintenance or weight loss will be different between individuals. The IOM recommends a minimum 60 minutes of moderate physical activity for body weight maintenance. This is an amount similar to the upper level of the ACSM recommendation. The IOM physical activity recommendation is an example of a guideline specifically intended to aid in body weight management.

Prevention of premature health problems

Rankinen and Bouchard (2002) summarized the results of a Consensus Symposium (sponsored by Health Canada and CDC, along with other agencies) to review the evidence for a dose-response relationship between physical activity and numerous health problems. They found that increased physical activity (e.g., intensity or amount) has additional benefits for all-cause mortality, cardiovascular disease, type 2 diabetes mellitus, obesity, and colon cancer. Other health problems (e.g., hypertension, depression and anxiety) have benefits from moderate levels of physical activity, but additional activity does not enhance the benefits.

Other recommendations

The increased emphasis on physical activity promotion has led to the explosion of physical activity research. Measurement of physical activity has become an important area of research, and the pedometer has emerged as a useful and effective tool for measuring and promoting physical activity (Tudor-Locke, 2002). Pedometers measure steps taken and pedometer-based physical activity recommendations have been promoted for adults. The popular press promoted 10,000 steps per day as a way for adults to meet the NPAR (Feury, 2000; Hellmich, 1999; Quittner, 2000); however, direct evidence for this claim has not been provided. In one study supporting the 10,000 steps per day target (Welk et al., 2000), it was found that healthy adults who added 30 minutes of MPA to regular activities of daily living accumulated between 9,000 and 11,000 steps per day. Nevertheless, one authority (Tudor-Locke, 2002) suggests that a universal step goal is inappropriate due to the variability in physical activity levels among different age groups in the population. In fact, a recent study (Tudor-Locke, Ainsworth, Thompson, & Matthews, 2002) shows a correspondence between 8,000 steps/day and approximately 33 minutes of MPA, which satisfies the NPAR promoted by the OSG.

In 1994 an International Consensus Conference was held to establish physical activity guidelines specifically for adolescents. These guidelines recommended 30 minutes of moderate activity on most days of the week and at least three days of vigorous activity weekly (Sallis, Patrick, & Long, 1994).

In 1998 the Council on Physical Education for Children, a subgroup of the National Association for Sport and Physical Education (NASPE), developed physical activity guidelines specifically for children. These guidelines were recently revised (NASPE, in press) and indicate that children should be physically active at least 60 minutes and up to several hours per day. Long periods of inactivity are discouraged for this age group, and several activity bouts a day are recommended. Therefore, engaging in long bouts of continuous vigorous activity is not a condition for children meeting this guideline. Appropriate activity for children includes intermittent moderate to vigorous physical activity. A similar set of physical activity guidelines for toddlers was published by NASPE in 2002. For more details the reader is referred to NASPE, in press and NASPE, 2002.

Summary

Over the past three decades we have learned much about physical activity. Over this time period many different sets of physical activity guidelines have emerged from many different groups. While some of the newer guidelines supersede previous guidelines, sometimes more recent guidelines are issued by organizations with different purposes designed to help people achieve different benefits. When interpreting physical activity guidelines it is important to be aware of the group preparing the guidelines, the mission of the group, the benefits to be derived from the guidelines if they are followed, and the specific group of people for whom the guidelines are intended. In many cases, published guidelines from one group may appear to conflict with those of another when they are merely intended for a different group of people or to achieve a different benefit.

Table 3.
PCPFS *Research Digest* Articles Containing Physical Activity Guidelines

Month	Year	Topic
September	2002	Dose Response for a Variety of Health Benefits
June	2002	Step Count Guidelines—Pedometers
June	2000	Flexibility
December	2000	Obesity
March	1999	Special Populations (people with disabilities)
December	1998	Older Adults
September	1998	Young People
March	1997	Muscle Fitness
June	1997	Diabetes
December	1996	Personalizing Physical Activity Prescriptions

Physical activity is essential for the healthy life.

Health/fitness professionals should use guidelines for the nature of the recommended elements of physical activity to enhance an active lifestyle for everyone and ensure additional benefits for specific health and fitness goals.

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